

## TECHNICAL ART HISTORY AND ARCHEOMETRY II AN EXPLORATION OF CARAVAGGIO'S PAINTING TECHNIQUES

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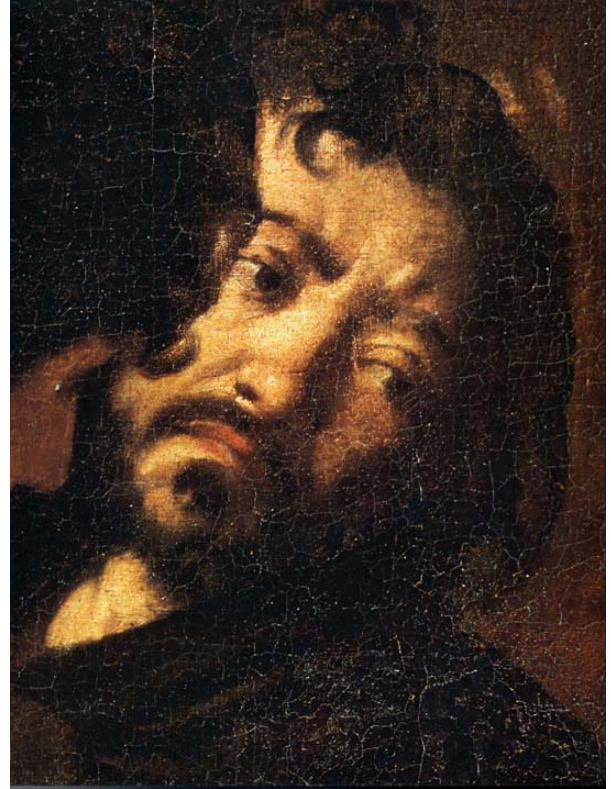
### Introduction

“Practice without theory is blind; theory without practice is lame.” This quip attributed to Albert Einstein speaks to most fields of human endeavor, and to our concerns here both with the practice of science, art, and art conservation. The notion of Technical Art History is proving to be an invaluable undertaking towards providing the valuable stimulus of linking making and seeing, theory and practice, fact and value, science and art.

Recent exhibitions of the work of the Italian painter, Michelangelo Merisi da Caravaggio (Fig.1) (1573-1610) have once again produced a group of his works for re-evaluation and study, many recently cleaned and newly documented. (1) The exhibition of Caravaggio's late works shown both in Naples and, slightly modified, in London, together with an exhibition of full-size digital transparencies of (nearly) all of Caravaggio's paintings in Chicago under the title, “*Caravaggio: La Mostra Impossibile*”, have served to focus attention once again on this remarkable artist. The latter exhibition was put together by RAI the Italian radio and television network, while problematic, nevertheless provides opportunities to study and to see these paintings in reproduction in ways that they can not be seen normally. Further RAI has produced a remarkable website, <http://www.caravaggio.rai.it>, that provides remarkable images of the paintings as well as the opportunity of enlarging and studying details heretofore impossible. Recent thorough and interesting technical studies have been published on specific paintings, such as the *Madonna de' Palafrenieri* (2), the *Madonna di Loreto* (3), the *Martyrdom of St. Ursula* (4), the two paintings in the Cerasi Chapel of S. Maria del Popolo (5), and the *Medusa*, a painted shield in the Uffizi (6) all of which have shed new light on the considerable literature previously published.

### Caravaggio technical studies: a brief overview

The earliest technical studies on Caravaggio's paintings came shortly after the exhibition in Milan organized by Roberto Longhi in 1951.(7) This exhibition brought new attention to Caravaggio who had at that point somewhat faded from art historical attention. Radiographs were made of the Contarelli Chapel paintings at the Istituto Centrale del Restauro in Rome with the startling discovery of at least two previous compositions beneath the *Martyrdom of St. Matthew*. (8) (Figs. 2, 3) Caravaggio's willingness to completely rework on top of previously established compositions is a characteristic that occurs here notably in Caravaggio's working process.



**Fig.1** Caravaggio, self portrait, detail of *Martyrdom of St. Matthew*, Contarelli Chapel, S. Luigi dei Francesi, Rome.



**Fig.2** Caravaggio, *Martyrdom of St. Matthew*, around 1600, Contarelli Chapel, S. Luigi dei Francesi, Rome.



**Fig. 3** Caravaggio, *Martyrdom of St. Matthew*, radiograph, detail of lower right side.

The three Contarelli Chapel paintings received conservation treatment during 1965-66 at the Istituto Centrale del Restauro during which highly discolored old varnish films were removed and the paintings were relined and mounted on new stretchers. (9)

Caravaggio's rise to fame in Rome in the 1590's is a remarkable story. Coming down from the northern province of Lombardy, and having trained with Lombard artists, one of whom, Peterzano, had studied with the great Venetian artist, Titian, Caravaggio's technique and materials reflected his northern background. Caravaggio's training in Rome was assisting in the studio of Giuseppe Cesare, the Cavaliere d'Arpino, where he seems to have specialized in the painting of fruit and flowers and assisting in fresco projects. (10) Several early texts by Caravaggio's contemporaries describing his difficult personality and unusual approach to painting can be found in Hibbard's biography. (11) His violent temper continually got him in trouble with the law, and when he killed a man in an argument he was forced to flee Rome. Among peculiarities noted in his painting technique is the fact that Caravaggio apparently did not make careful preliminary drawings before painting nor did he devote himself to drawing after ancient sculpture as did most of his contemporaries. Most painters began by making sketches that they then worked up into a final, carefully detailed drawing. The drawing was then transferred to the prepared canvas by one of several techniques including "pouncing" the pricked lines with charcoal dust, incising the lines into the wet ground using a stylus or other means. The canvas would have been typically linen attached by tacks to a wood strainer and prepared with animal glue

priming followed by a ground or preliminary layer consisting of pigment ground in oil that served to fill in the rough texture of the canvas. By Caravaggio's time it would have been possible to purchase a canvas to which a ground had previously been applied. Typically by the late 1500's the ground would have been composed primarily of inexpensive pigments—red earth, yellow ocher, umber and a small amount of lead white to assist in drying, plus a fair amount of chalk. The artist would then normally add a light gray or tan second ground on to which he would transfer his drawing and begin to paint. While Caravaggio used a light gray ground in some of his earlier works, by the time of the Contarelli Chapel paintings, his first major commission, he had begun to paint directly on to the dark, earth toned red-brown, or dark brown single ground which he used to enormous dramatic effect with brilliant single source light. Caravaggio was known not to have used a thoroughly worked out drawing which he then transferred to the canvas, but rather began drawing directly on the canvas and, another anomaly, worked typically directly from live posed models. How he did this has been revealed with ensuing technical studies.

The detailed study of the Detroit Magdalen in 1974(12), followed by major exhibitions between 1985(13) and 1991-92(14) resulted in great advances in documentation and connoisseurship of Caravaggio's oeuvre, "The Age of Caravaggio" in New York and Naples in 1985 followed by the exhibition in Florence, Rome and Milan with comprehensive technical studies, notably radiography and infra-red reflectography provided us with a significant basis for understanding Caravaggio's materials and painting procedure and thus of connoisseurship. Keith Christiansen's contributions to the use of technical studies in Caravaggio connoisseurship in the exhibition at the Metropolitan Museum in New York focused on Caravaggio's two *Lute Players* in 1990 demonstrated Caravaggio's working method in producing a second version of a painting with adaptations to suit the patron. (15) Larry Keith's technical studies of the three Caravaggios in the London National Gallery published in 1998 are a further significant advance in the documentation of Caravaggio's painting techniques and materials.(16)

Using all of the technical and art historical information we now have on the paintings that can be firmly attributed to Caravaggio we can summarize his technical practices as follows:

- 1) Preference for using a linen canvas support mounted on a wooden strainer.
- 2) Preference for dark red-brown ground, often left visible, and used as mid-tones.
- 3) Preference for working with direct observation from life.
- 4) Use of dramatic, single-source lighting.
- 5) Use of incisions done free-hand in the still moist ground to establish the composition and fix the pose of his models.
- 6) Did not use preliminary sketches but began by loosely drawing the outline of forms in dark

paint and locating major highlights in lead white (*abbozzo*).

- 7) Used limited palette, primarily earth colors, ground in walnut oil.

**Support:** By the end of the 17<sup>th</sup> century in Italy most painters had adopted the use of a linen support as a less expensive and more practical painting surface than wood panels that had predominated previously. Wood panels of cypress were supplied to both Annibale Carracci and to Caravaggio for their paintings in the Cerasi Chapel, however after painting and abandoning his first version of the *Conversion of St Paul* painted on panel, Caravaggio changed to canvas for both of his paintings in the chapel. Caravaggio did not paint in fresco in a time when large major commissions were available to decorate the walls of churches and palaces and though he worked as an assistant to the Cavaliere d'Arpino in his fresco commissions. Caravaggio's one wall painting, a ceiling in the Villa Ludovisi, was executed in oil. His one other painting on panel, the *David and Goliath* in Vienna, was painted on top of a painting by a different artist. Caravaggio's canvases were typically a medium, simple weave, 7 x 7 cm sq., but on occasion he used a twill weave canvas called "tela Olona", typical for the Veneto, for example in the *Madonna dei Palafrenieri*, and a linen with interwoven lozenge pattern called "tela di Fiandra" normally used for table cloths, as in the Cleveland *Saint Andrew*. A number of Caravaggio's paintings are on top of previous paintings, such as in the *Still Life* in the Ambrosiana, the *Fortune Teller* in the Capitoline Museum, and the *Lute Player* in the Metropolitan Museum, New York.

**Ground:** While gray grounds, more typical of Lombard painting, can be found in some of Caravaggio's early paintings in Rome, such as the Kimbell *Cardsharps* and the Capitoline *Fortune Teller*, most of Caravaggio's paintings have a dark red-brown, somewhat translucent ground that he came to utilize in a very particular manner. Caravaggio's contemporary, Giovan Pietro Bellori, observed that Caravaggio "left the ground visible in the half-tones" (...*lasciò in mezzetinte l'imprimatura della tela*). This particular feature of Caravaggio's technique, something of a short cut, can be observed particularly in most of his mature and late works, and has been discussed by Larry Keith in regard to the *Boy Bitten by the Lizard* in the National Gallery, London(18) (Fig.4). This ground characterized by Keith as "naturally translucent as well as dark in color", is composed of chalk (calcite), earth pigments and a little lead white, and is visible in the shadows on the upper body beneath the head, and in the drapery to the right of the head. Its translucency is apparently imparted by the considerable quantity of chalk in the mixture. The dark, sketchy brushwork of the *abbozzo* can be seen in these areas as well. Where Caravaggio used a rough twill weave canvas, such as in the *Madonna dei Palafrenieri*, he first applied a layer of gesso composed of chalk and glue to minimize the canvas texture before applying the dark red-brown oil ground.



**Fig.4** Caravaggio, *Boy Bitten by a Lizard*, late 1590's, London, National Gallery.

**Preliminary drawing:** While most artists who were Caravaggio's contemporaries were trained in drawing from life and from ancient statuary and in planning their compositions by means of careful drawings, Caravaggio seems to have shunned these practices. We have no drawings by Caravaggio unlike the prolific work of his contemporary Annibale Carracci. Caravaggio insisted on painting directly from life and utilized an approach of rapid but careful sketching his composition in brush and dark paint, establishing the principal highlights with dashes of white lead, and incising the principal outlines of his composition into the still wet ground before applying the colors.

**Paint layers:** Where Caravaggio's medium has been identified it appears to have been predominantly walnut oil, most likely it was first heated with litharge for quicker drying. For highlights on the skin tones he apparently used a mixture of oil and egg tempera, identified in the Detroit *Magdalen* and the London *Boy Bitten*. His pigments were relatively few, in comparison with the great range found in Venetian paintings. His basic palette included lead white, red and yellow ocher, lead-tin yellow, vermilion (cinnabar), malachite, carbon black and earth colors, plus madder lake and copper resinate glazes.

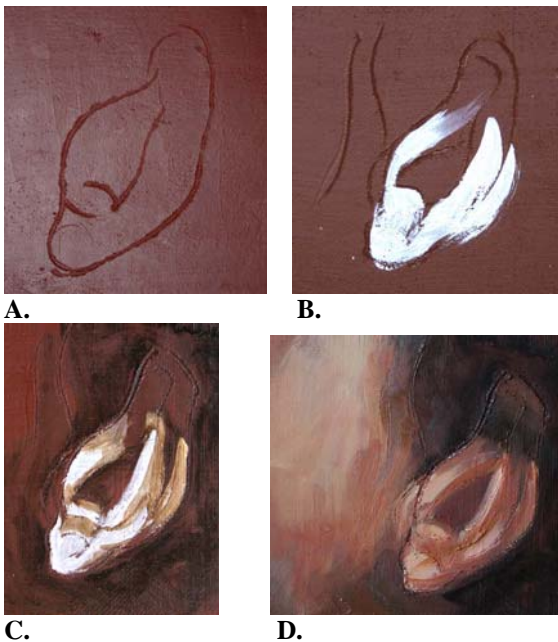
### Reconstruction

In the painter's workshop of the 17<sup>th</sup> century all paints had to be prepared daily and sufficient for the work at hand. Most painters had assistants or apprentices employed for this work, but had put in their time preparing paint as apprentices themselves. Caravaggio most likely had someone to help in the daily grinding of colors. (Fig 5) Reconstruction of a

detail of the ear of the male pilgrim in the *Madonna di Loreto* is shown in Fig. 6.



**Fig. 5** Detail from an engraving by Stradano showing color grinders at work in a large studio.



**Fig. 6** Four stages in painting an ear: A. Incision in the wet ground, B. Application of lead white highlights, C. Dark sketch, D. Flesh tones and highlights—Reconstruction by Sarah Belchetz-Swenson after the *Madonna di Loreto*

The experience of handling and preparing the range of pigments used by Caravaggio and his contemporaries is exceptionally enlightening for anyone interested in art and art process. Each of the pigments has a unique origin whether from the ground in the form of minerals such as malachite, cinnabar and azurite or manufactured, in the case of lead white and lead-tin yellow, or from roots in the case of madder lake, insects in the case of cochineal or kermes, plants such as indigo or weld, and earth pigments, the umbers and ochers. Unlike modern manufactured paint each of

the pigments had its own particular character and demands for handling and preparation that a well-trained painter like Caravaggio would have been familiar with from apprenticeship and doubtless had a fundamental affect on the sound craftsmanship demonstrated in all of his paintings.

### Conclusions

Caravaggio's profoundly moving images were produced by an exceptionally efficient and increasingly effective technique adapted to the needs of execution using live models and later to the needs of swift execution. The sound craftsmanship and materials used have produced paintings of exceptional durability. An understanding of the materials and experience in their handling and application can contribute exceptionally to appreciation of his work. (Fig. 7)



**Fig.7** Brian Koelz working on a reconstruction of Caravaggio's London *Supper at Emmaus*, at Northern Light Studio, St. Louis, MO, USA.

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